My Bench

The elegant Dining room Chair

Ryan Casberg

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Introduction:

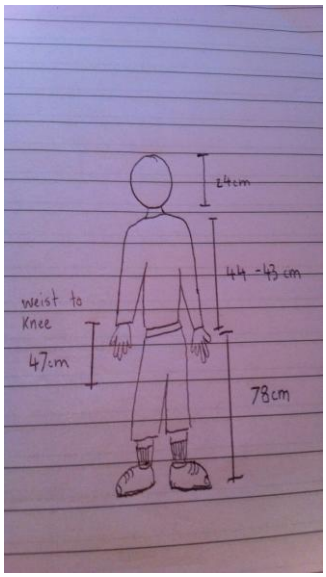
I am designing a chair for a dining table, people cannot find a cheap simple chair as comfortable as this one. The chair that I have designed has simplicity and comfort. The Chair that I have designed will be sold at IKEA and the hopefully in the near future be in peoples homes as one of their own dining chairs. The few main aspects I would like to reveals the most is simplicity and comfort as my personal home dining chairs are not, that is what gave me my inspiration.

Here are a few simple inspirational chairs as possible dining chairs.[1]

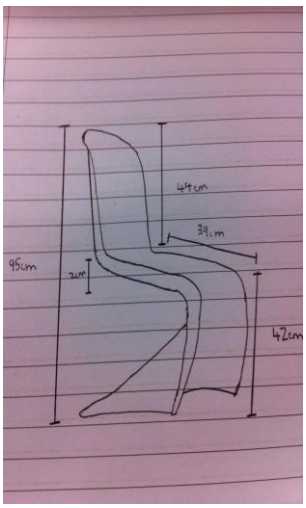
Initial Bench Research:

What I would need to know about benches is the layout of one, as people need comfort. My chairs back rest tilts slightly backwards to give more relaxation rather than a straight upright position. The measurements that I will need on ones body is :

- Average back length
- elbow to wrist length
- waist to knee length
- Total height



Drawing 1: This is a sketch of my human measurements



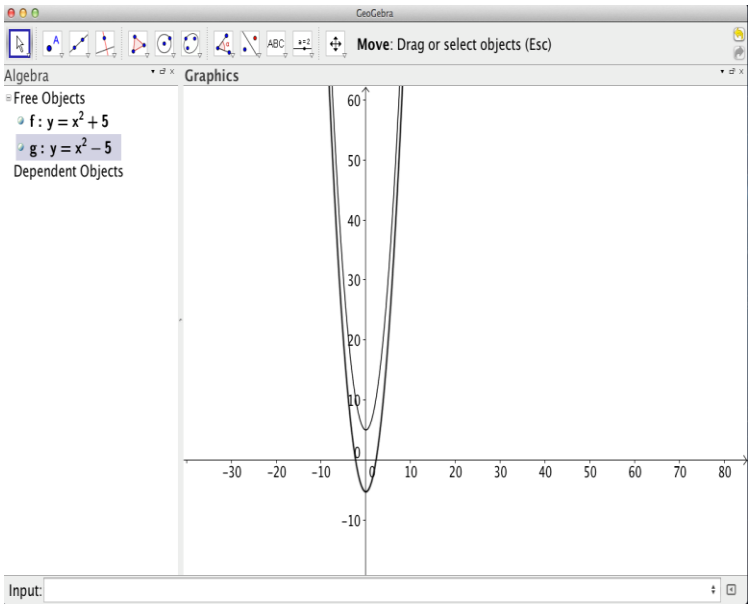
Drawing 2: This is a sketch of my bench

I will get them by measuring one 3 of my relatives and later conducting an average calculation using the formulae "(A2, A3.....An)/N". The most helpful information for a bench to help me would be that average length of the chair components, such as the seat length, back rest length e.t.c. "important rule for Quadratics" = y= a(x^2+h)+k / The a represents

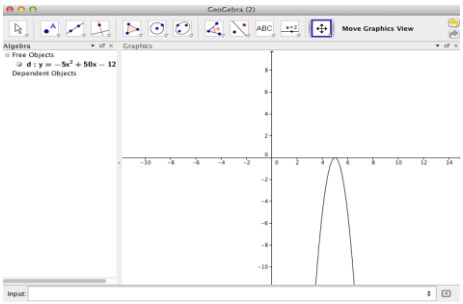
[1] http://www.google.com/search?um=1&hl=zh-TW&safe=off&client=safari&rls=en&biw=1245&bih=684&tbm=isch&sa=1&q=dining+chairs&oq=dining+chairs&gs_l=img.3..0i19l10.1211353.1212894.0.1213110.13.10.0.3.3.0.76.472.10.10.0...0.0...1c.1.3d_19PukRcg

Initial function research:

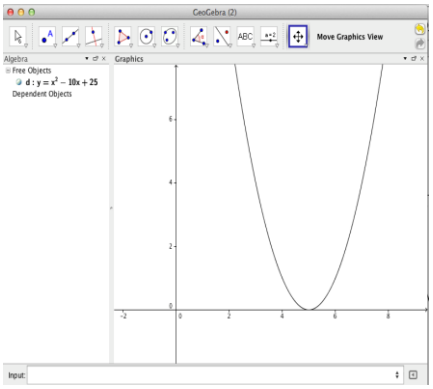
1.For my initial function research, I will conduct two kinds of functions, one including the parabolas. A parabola is an open plane curved form line created by an intersection through the cone shaped figure. I will be conducting my chair using the parabola methods. While investigating through Geogebra, The first method I have found was in the family of "y=x^2 + 5". If my increasing to five, this means that on the Y axis, it travels up five units. The equivalent of this is to subtract five to travel across the X axis and you would win up on the -5 units on the y axis. For transformations, in order to shift we must place the number in a bracket and square it " y=(x-5)^2" this will place it on our right hand side of the equation because it is a negative, for positive it will place it on out left. In order to reflect it along the x axis, we must place a positive or negative outside the bracket "y=-(x-5)^2". Negative will place it below and positive will place it on top. In order to stretch the parabola, you must place a number outside the bracket which will increase or decrease the stretch. "y=a(x-5)^2". The "a" is the unit in which you must increase or decrease to get the stretch.



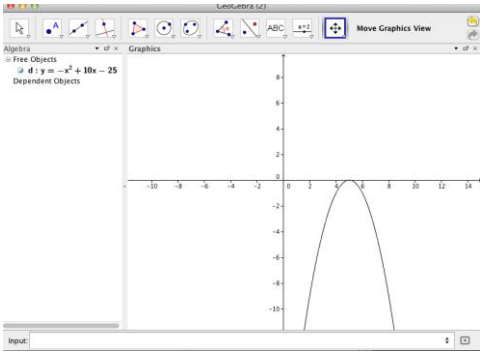
This is the formula y=x^2 + or - "5"



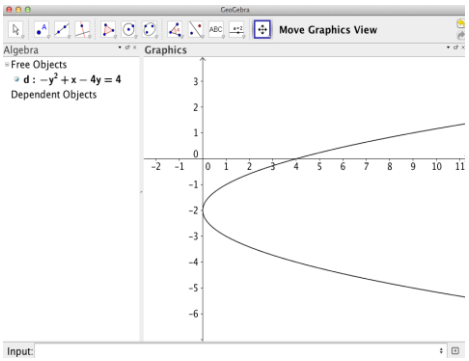
Drawing 3: This is an example of a thin stretch



Drawing 4: This is the shift



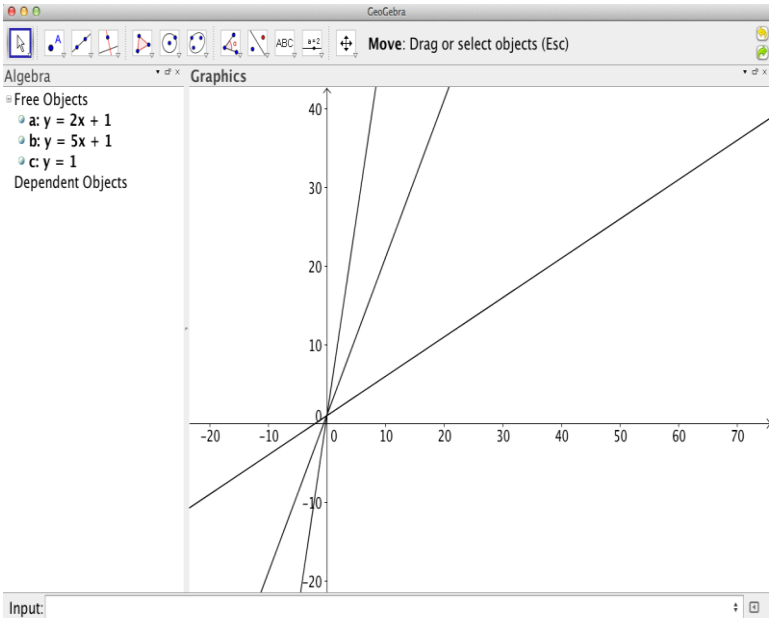
Drawing 5: This is the flip



Drawing 6: This is the rotation of the parabola

2.

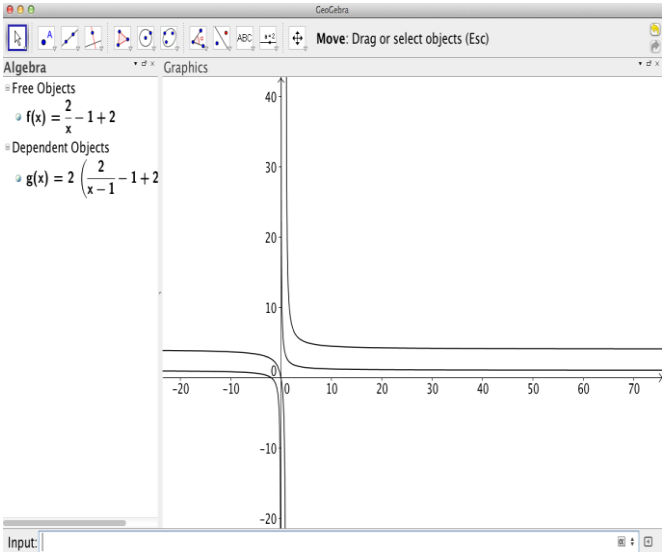
The second function I have been exploring is the function of stretch diagonal linings., what I first learn't from this function was that I noticed for this function you do not have to include the squared added to the X as this creates the oval curve. By cutting out the squared, it forms a horizontal, vertical or diagonal line. In my case, these are all diagonal lines based on the equations y=2x-1, y=5x+1 and y=1.



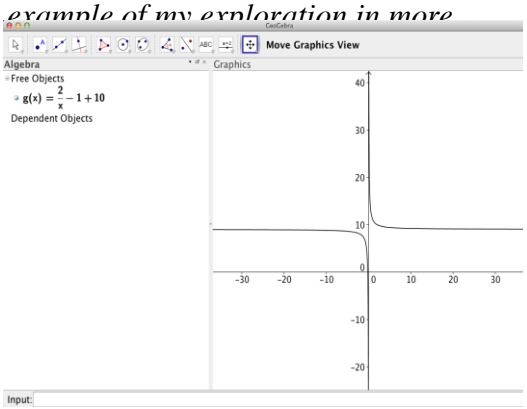
This is my exploration in the stretch diagonal linings.

3.

The final function I have been exploring is one of the most important ones in creating my bench as the curved L shaped lines, this function is also included in the stretch category. As the seat of my chair and the legs are formed by L shaped. This formula will be very useful for my final product. In order to incorporate this, I had in include a fraction. The equation that I input was y=2(2/x-1+2). In the second equation, I have used the transition of shift where I have shifted it upwards 10 units. I have taken the "2" from the end of the bracket in the first equation and changed that digit to 10 units. Since there is an identical shape the reflection would be exactly the same. In order to rotate, it would almost be the same a flipping as it is a fixed shape

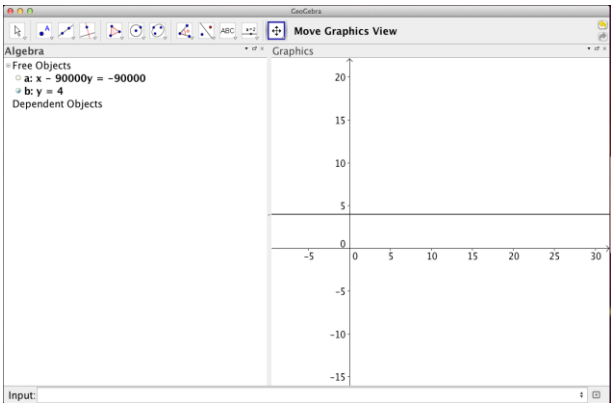


This is an example of my exploration in more stretches

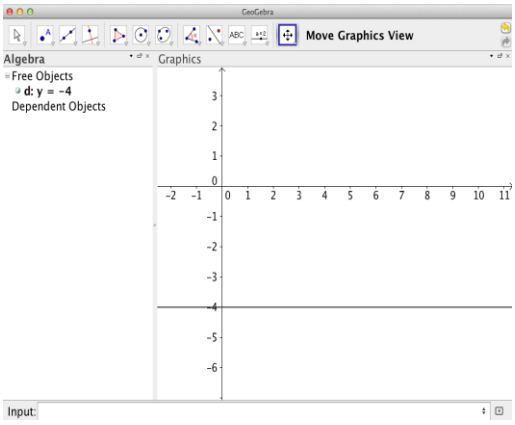


Drawing 7: This is my shift, i have shifted it 10 units upwards

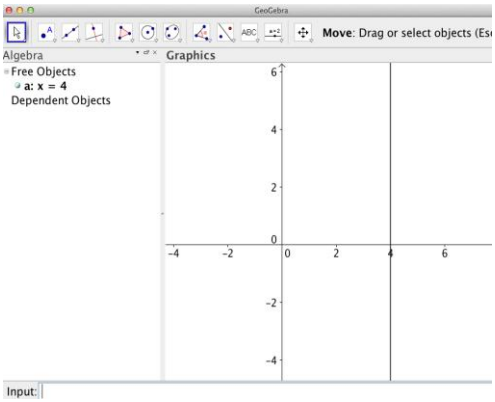
4. I first used the drag line to help me incorporate the straight line as I could not find out how. I then deleted the forged line and typed in the equation myself as the teacher told me I would get a low mark if I did not forge it myself. The equation was simple, I found out you use the y=4. In order to rotate it along the x axis I would have to replace the y with and x. X=4 and so on. For this, if would be the same to reflect as it is a straight line.



The equation i used was a simple y=4 or so on. I used this to create my lower support leg



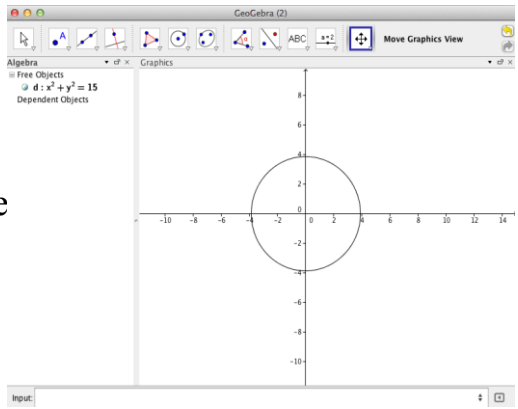
Drawing 9: This is an example of reflection



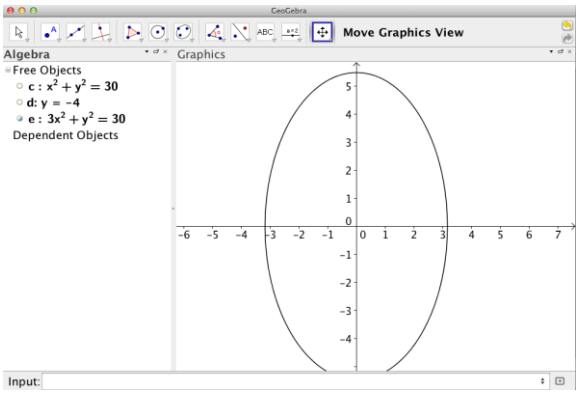
Drawing 8: This is an example of rotation

Function 5.

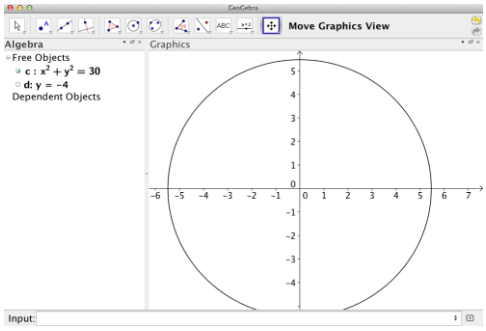
This is an unfamiliar function which is a circle. I do not think I will need to include this into my chair but then I know how to calculate this. The equation I used was "x^2+y^2=15". Increasing the 15 number will increase the overall size of the circle starting from the vertex of the circle. The second transition is expantion where I increase the outer number "15" to "30" where it would expand 15 more units on the outside perimeter.



Drawing 10: This is an example of an unknown circle



Drawing 12: This is an example of stretch aswell but on the x axis increasing 3



Drawing 11: This is an example fo expansion

Functions:

Shift:

The purpose of this function is to move the vertex left or right. The equation is y=x^2+k, the k represents the shift in which left or right, if the K is a minus, it moves right, the a positive K moves left.

Reflection:

There are two types of reflections, one is on the x axis and the other is on the y. You may either change the negative for the whole formula this reflects on the Y axis and if you change the negative in the bracket which will just change reflection the X axis.

Rotate:

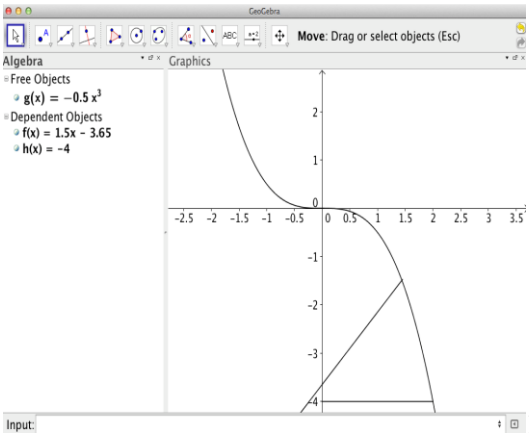
The rotation is when you switch the X and y with each other resulting in a rotation. x=y^2+k is an example. Rotation is keeping it in the same position but rotating it left or right.

Stretch:

An example stretch is y=a(x-5)^2 which will widen the width resulting in stretching it. In order for the stretch to go wider, the number you input must be smaller in which

you place it in. Increasing or decreasing the A will change the stretch.

Geogebra Bench:



THis is my geogebra sketch.

The equations I used for this was y= -0.5x^3 where I would decrease the number for the waved line which will widen the length . For the leg support area, the equation I had to type "function" into the bar which would give me a slot where I would have to put each measurement into to get it perfectly at 3.65 to touch the curve of the larger chair. The last component was the leg support at the bottom. For this I also had to input "function" into the bar and type in -4=function, 0=start, 2=end. I did not completely get the exact measurements correct and the visual standpoint, but I am happy that I can get the overall outline shape of my product. I will include the mistakes in the error percentage included down below.

Percentage Error:

Positions	Predicted	Geogebra
Back rest	44cm	3cm
height	95cm	7cm
seat	39cm	2.5cm
Rear support bottom	42cm	3.5cm
Angle decrease of seat	2cm	0cm

Back rest: 44-3/44 x 100% = 37.1818
Height: 95-7/95 x 100% = 87.631
seat: 39-2.5/39 x 100% = 32.5897
rear support bottom: 42-3.5/42 x 100% = 33.66666667

]

Initial Bench Design:

My bench is a simple, it has a slightly curved backrest, a square seat equal to the length three quarters of the backrest. The legs of the chair are all slightly inverted front (for the front two legs) and back (for the rear legs).

Initial Measurements of chair positions:

Position:	Length	Units
Back Rest	44	cm
height	95	cm
Seat	39	cm
Rear Support bottom (under seat)	42	cm
Front Legs	42	cm
Angle decrease of seat	2	cm

Bibliography:

"Bench (furniture)." *Wikipedia*. Wikimedia Foundation, 09 June 2012. Web. 17 Sept. 2012. <http://en.wikipedia.org/wiki/Bench_(furniture)>.

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Reflection:

Over the course of this, I have enjoyed it a lot, even though there were challenges and ups and downs as I did not know how much was expected. But then I had all the requirements in and I was happy with my overall work.